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BOBBIN CORE

[Bobinenkern]

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/1[1]

Bobbin Core

The invention concerns a bobbin core for transporting bobbins (2) to be stacked one on top of the other that accommodate tape-shaped strips, which is configured essentially as a cylindrical pipe section. It has a ring-shaped recess (13) on one face side and a projection (12) on its other side, so that several cores (10) can be stacked one on top of the other in a non-relocatable way in that the projection (12) of a first core locks in the recess (13) of a second core. /2

Specification

The invention concerns a bobbin core for accommodating tape-shaped strips, in particular of cigarette paper, according to the preamble of claim 1.

Many flat and flexible materials, such as, for example, aluminum foil, polypropylene or cigarette paper, are wound as bobbins for storage and transport around a core made of cardboard or plastic. Several of these bobbins are stacked one on top of the other for transport; up to 40 bobbins of, for example, cigarette paper, are stacked in this way. Many of these stacks, as a rule between 4 and 6, are stacked on a

[1] Numbers in the margin indicate pagination in the foreign text.

standardized wood pallet, whose maximum height is approximately 1 m. Between the lower wood pallet and the bobbin stacks is arranged a cardboard layer with a thickness of approximately 3 mm, which should prevent a slipping of the bobbins during transport. A corresponding cardboard layer is placed on the upper side of the bobbin stack before the upper wood pallet covers the stack from above. In order to make the pallets transportable, tension bands of steel or plastic are pulled around the pallet.

This design has replaced an earlier design, which provided paper or cardboard layers between the bobbin layers, as well as a stretched film, which was pulled around the entire pallet. The paper or cardboard layers between the individual bobbins prevented the slipping of entire bobbin stacks with respect to each other, while the stretched film prevented the slipping of entire bobbin stacks. Since, however, the stretched film, which is not recyclable, as well as also the large quantities of paper for the intermediate layers represents a considerable burden for the environment, both arrangements were discarded for the storage and transport of bobbins.

This created the problem that bobbins stacked on pallets lose considerable stability, can easily slip with respect to each other, or can be pushed inwardly or outwardly. It was

determined that only with a strictly observed tension on the tension bands for the wood pallets of 600 Newton/ribbon could be ensured a relatively safe transport. With this occurred now the problem that electrical manually tightening devices could produce the power, but the exact tension could not be directly determined.

A tension that is too low causes that the stacks are not pressed sufficiently strongly against the palettes and against each other, so that the bobbins can slip outward or inward. If an excessively strong tension is applied on the tension bands, the upper and lower pallets made of wood can bend in the direction of the stacks. The lower wood plate can thus be pulled off its pillars on which it stands, which leads to an inclined position. In addition, the stacks are pressed inward and can be pushed in or damaged at their upper and lower ends by the wood plates.

It is possible to considerably increase the number of tension bands around a pallet to such an extent that a better security against slipping can be attained. This solution cannot be economically carried out, however, because of the much longer time and work effort.

From EP 0 067 656 is known a process for packaging polyvinyl butyral layers in rolls, in which particular measures

for preventing a damage of the material surface during transport are provided. The material is bound for this purpose to cylindrical cores, wherein the cores are preferably hollow and secured by holding mechanisms on the upper and lower wood plates of a pallet. However, only one cylindrical core, that is, also only one roll, can be mounted in this way. The process is not suitable for securely retaining many superimposed rolls on a pallet.

A further arrangement for stabilizing materials that are transported on pallets is known from EP 0 405 852. The arrangement also stabilizes single rolls by means of intermediate layers having openings through which pipe-shaped core ends of the material that is transported can be inserted. This arrangement also requires intermediate layers between all vertically stacked material rolls. This renders it unsuitable for stabilizing material rolls, in which very many rolls are to be stacked one on top of the other, since this requires a great deal of time and work.

Since bobbins are frequently stacked by a robot and are also unloaded in the same way by a robot that grips with one arm from above into the bobbin core and lifts the bobbin by clamping onto it, then it would make sense not to insert rods into the bobbin stack, since this would imply another complicated

operating step for the robot in order to remove the rods from the stack.

It is therefore an object of the invention to provide a bobbin core configuration that prevents the slipping of bobbins with respect to each other in an environmentally safe pallet structure, even if a tension that is not optimal is present at the tension bands. The automatic manageability should continue to be ensured.

This object is attained by means of the invention disclosed in claim 1. Advantageous further developments are disclosed in the dependent claims.

According to the invention, the bobbin core for the transport of bobbins that are stacked one on top of the other is provided at one of its face sides with a ring-shaped recess, while a projection is provided at its other side. The recess and the projection have essentially the same shape and size, so that the projection fittingly engages into the recess when the bobbin cores are stacked axially one on top of the other. In this way, the cores do not slip with reference to each other and form a fixed column on the material that is wound around them, whose stability is not endangered even under strong transport strain, for example, when the truck takes a curve at high speed. The bobbin stacks that are secured in this way can be

automatically loaded on pallets, which must then only be held together by means of tension bands. An additional stretched film that is wrapped around the entire pallet can thus be eliminated. Furthermore, the previously used paper layers between the individual bobbins become superfluous.

The recess in the core can be configured in such a way that it forms shells that run parallel with reference to the bobbin axis. The projection is accordingly configured in this embodiment, so that two planar surfaces meet each other, which provides the bobbin cores with additional stability.

In another embodiment, the recess and the projection are configured with shells running at an acute angle with respect to the bobbin core axis, so that a cone is formed. This has the /3 advantage that the bobbin cores engage better with each other when they are stacked. This also applies for a further embodiment in which the shells running along the bobbin core axis form an obtuse angle.

The height of a bobbin should correspond essentially to the height of the bobbin core according to the invention between the projection and the recess, so that the face side plane of the bobbin core provided with the recess terminates with the surface of the would strip. This reduces the danger that material will reach into the area of the recess or the projection and obstruct

a secure interlocking of the bobbin cores when the material is wound.

The bobbin core is preferably made of plastic. Bobbin cores such as these retain their shape even under great strain, are lightweight, and can be recycled once the wound materials have been transported and unwound.

A preferred embodiment of the invention will be described in greater detail with reference to the enclosed figures, wherein:

Fig. 1 shows a longitudinal section through a bobbin core;

Fig. 2 shows a cross section through a bobbin core; and

Fig. 3 shows a pallet with bobbin stacks, in which

a) is a longitudinal section,

b) is a cross section, and

c) is a plan view.

Fig. 1 shows three bobbin cores 10 stacked one on top of the other. The cores 10 are preferably made of plastic, wherewith a great resistance and stability of the lightweight cores 10 is ensured. The cores can be recycled. The bobbin cores 10 are, as a rule, automatically "loaded" by winding the tape-shaped material, for example, cigarette paper, aluminum foil, or polypropylene, around the core 10. The wound bobbins 9 are in turn automatically stacked. A robot arm reaches from the

inside into the bobbin core 10 and clamps it in. Fixed rods in the cores 10 are therefore undesirable, even though this would increase the stability of the bobbin stack 2, since an additional work step would be necessary for their removal before the bobbin cores 10 could be gripped by the robot.

The bobbin core 10 is configured essentially as a cylindrical pipe section, encloses a hollow space 11, and is wrapped around with material between the plane at the face side of a radially outwardly located projection 12 and the face side base plane of a recess 13. The core diameter, for example, for cigarette paper, amounts to 120 mm, the one for aluminum foil, polypropylene and other materials can amount to 70, 120 or 150 mm.

The projection 12 and the recess 13 are configured with shells running parallel to the bobbin core axis. Both are preferably configured on the outer annular periphery and have in the normal case an axial depth or height of 1-3 mm.

In another preferred embodiment, the projection 12 and the recess 13 are configured with shells that run at an acute angle with respect to the bobbin core axis, so that they form a cone. The inclined shell can run in another embodiment also at an obtuse angle with respect to the bobbin core axis.

In any case, the recess 13 and the projection 12 are configured in such a way that they interlock if the cores 10 are stacked one on top of the other. In this way, they are mutually fixedly secured against slipping and can be transported on pallets without requiring additional auxiliary means, such as stretched films or paper layers between the individual bobbins 9.

Fig. 2 shows a bobbin core 10 according to the invention in cross section. It encloses a cylindrical inner space 11, into which a robot arm can reach. Around the bobbin core 10 are wrapped material layers, which form the bobbin 9.

Fig. 3 shows pallets 1, which are loaded with bobbin stacks 2. On the pallet 1 rests a bottom cardboard layer 7, which secures the bobbin stack 2 against slippage on the wood plate 4. Thereon are stacked the bobbins 9 for transport and storage. Depending on the material to be transported, 4-6 bobbin stacks 2 can be placed on a pallet. In the case of cigarette paper, for example, 30-40 bobbins 9 can be stacked to form a stack 2, with aluminum foil 7-10 bobbins 9 can form a stack 2. Each bobbin 9 is provided with a core, whose recess and projection ensure a secure hold of the entire stack. The uppermost bobbin 9 is covered by an upper cardboard layer 8 and an upper wood plate 5. The total height of a typical pallet amounts to approx. 1 m.

In order to mount and secure the pallet 1 during transport, tension bands 6, in particular of polyester, which have a reduced relaxation, are wrapped around the pallet 1. 2 tension bands 6 are sufficient for each side in order to secure the pallet, which is loaded with bobbins 9 having the core according to the invention. The preferred tension of the tension bands 6 amounts to 600 Newton/band. In this way, the pallets 1 can be transported without the aid of a stretched film and additional paper layers. A slipping of the bobbins 9 with respect to each other is prevented, the bobbins are not damaged, and the transport was not encumbered by protruding bobbins.

List of Reference Numerals

1 Pallet

2 Bobbin stack

4 Lower wood plate

5 Upper wood plate

6 Tension bands

7 Lower cardboard layer

8 Upper cardboard layer

10 Core

11 Hollow inner space

12 Projection

13 Recess

Patent Claims

1. A bobbin core for bobbins to be stacked one on top of the other for accommodating tape-shaped strips, which is configured essentially as a cylindrical pipe section, wherein the bobbin core has a ring-shaped recess (13) on one of its face sides and a projection (12) on its other side, in which the projection of a bobbin core in axially superimposed bobbins fittingly engages into the recess of the adjacent bobbin core.

2. The bobbin core of claim 1, wherein the recess (13) and the projection (12) are configured with shells running parallel to the bobbin core axis.

3. The bobbin core of claim 1, wherein the recess (13) and the projection (12) are configured with shells running at an acute angle with reference to the bobbin core axis.

4. The bobbin core of claim 1, wherein the recess and the projection are configured with shells running at an obtuse angle with reference to the bobbin core axis.

5. The bobbin core of one of the preceding claims, wherein the face side plane of the bobbin core is located in the lateral plane of the wound strip. /4

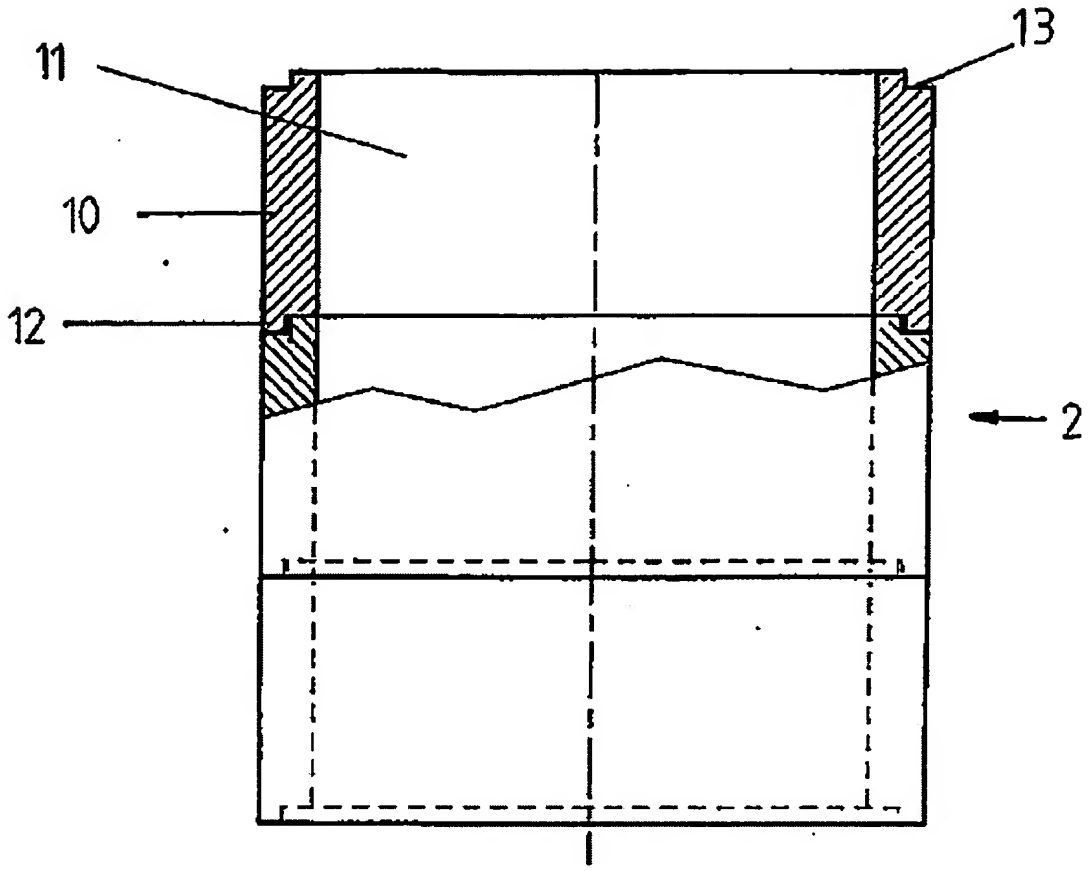

FIG. 1

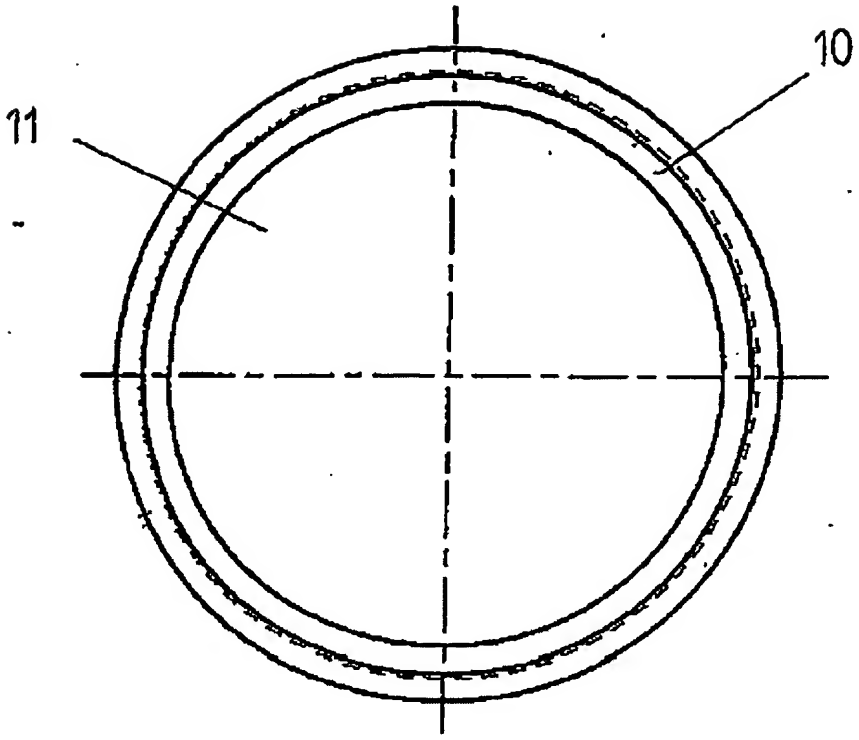

FIG. 2

FIG. 3A

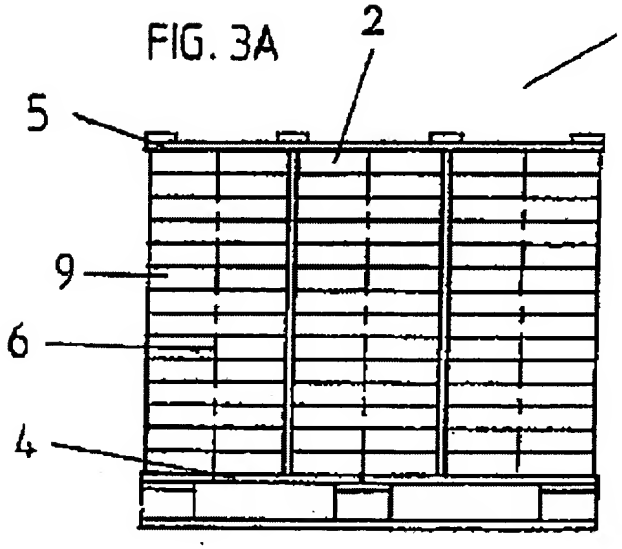

FIG. 3B

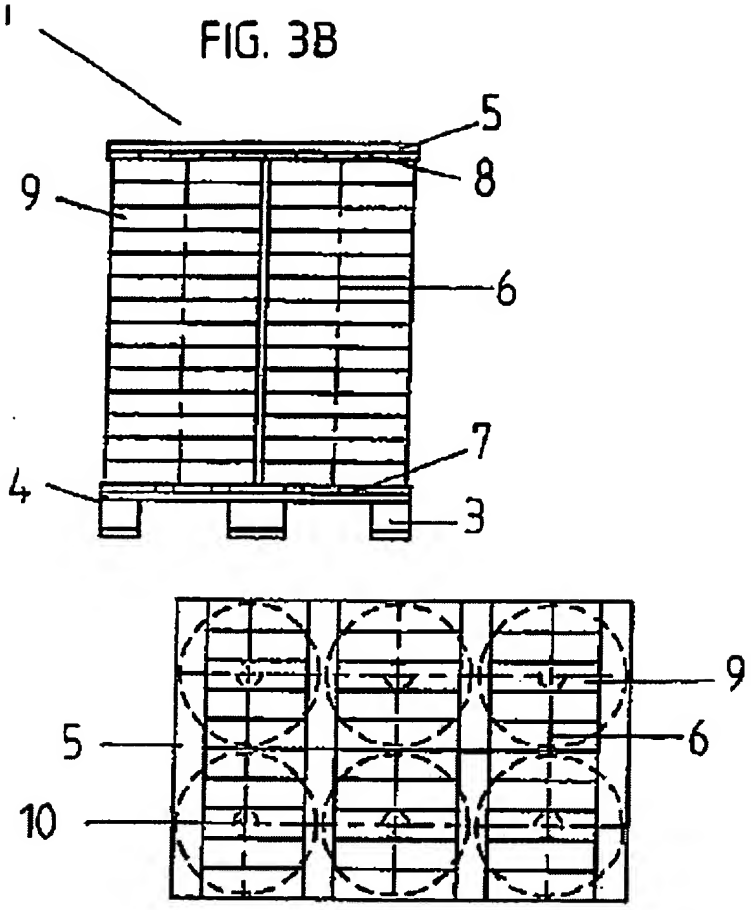

FIG. 3C